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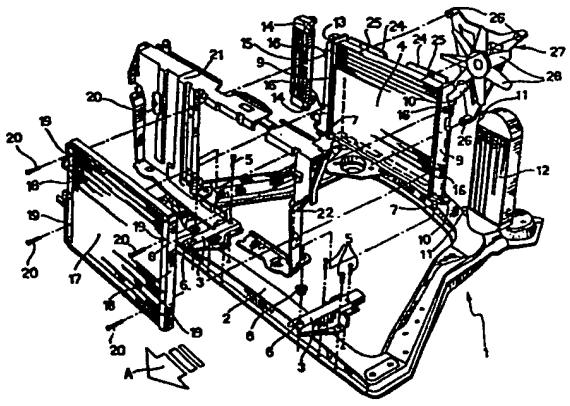
(71) Applicant: FIAT AUTO S.p.A., Corso Giovanni Agnelli 200, I-10135 Torino (IT)

(72) Inventor: Villari, Marcello, Via Cervino 8/C, I-10044 Pianezza (Torino) (IT)
Inventor: Marcolin, Dario, Corso Torino 3/A, I-10095 Grugliasco (Torino) (IT)

(74) Representative: Notaro, Giancarlo et al, c/o Jacobacci-Casetta & Perani S.p.A. Via Alfieri, 17, I-10121 Torino (IT)

(54) **Motor vehicle including a preassembled subassembly formed by the power unit and a series of components of the systems of the vehicle.**

(57) The radiator (4) of the engine cooling system is fixed to a sub-frame (1) supported by the vehicle body and carrying the power unit. Further members of the motor vehicle systems are supported by the structure of the radiator (4).



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Motor vehicle including a preassembled subassembly formed by the power unit and a series of components of the systems of the vehicle.

The present invention concerns motor vehicles, particularly of the type comprising a body, a power unit, a sub-frame supported by the body and carrying the power unit, and a series of members forming parts of the systems of the motor vehicle, among which is the radiator of the engine cooling system.

In this specification and in the following claims, the expression "systems of the motor vehicle" is used to mean the various systems with which the motor vehicle is provided, such as, for example, the engine cooling system, the system for cooling the engine lubricating oil, the air-conditioning system for the passenger compartment of the motor vehicle, the engine supercharging system.

According to a technique already used by the Applicants, the power unit, that is, the engine together with the transmission (including the gearbox and, in the case of a motor vehicle with front-wheel drive, the front differential), is mounted separately on the sub-frame, after which the sub-assembly made up of the sub-frame and the power unit is installed in the body of the motor vehicle. Clearly, this technique allows the power unit to be asembled much more easily in that its assembly is not impeded by the presence of the body. At the same time, it is also possible to provide for automatic installation of the subassembly in the body of the vehicle.

According to the aforesaid prior art, the various components of the systems of the motor vehicle, such as, for example, the radiator of the engine cooling system, the heat exchanger for cooling the lubricating oil of the engine, the engine fan, the condensor of the air-conditioning system, etc., are installed in the body after the latter has received the subassembly made up of the power unit and sub-frame.

It is clear that, in order to allow even easier and quicker assembly of the various parts of the motor vehicle, it would be desirable for the members forming parts of the various systems of the motor vehicle also to be assembled on the sub-frame before it is fitted into the body, so as to constitute a single subassembly which can be fixed within the body of the motor vehicle in a single operation.

The object of the present invention is to provide a motor vehicle of the type specified above, which has a configuration and arrangement of parts such as to permit the said members of the systems of the motor vehicle to be preassembled on the sub-frame in a particularly easy, quick and practical manner.

The main characteristic of the invention lies in the fact that the radiator of the cooling system is fixed onto the sub-frame, and in that

the remaining members of the motor vehicle systems are supported by the structure of the radiator.

According to a further characteristic, the sub-frame has a frame structure including a front cross member carrying the radiator of the engine cooling system, and the radiator has a pair of end manifolds each having a body with brackets or bosses for the fixing of the said members forming parts of the motor vehicle systems.

Further characteristics and advantages of the present invention will emerge from the description which follows with reference to the appended drawings, supplied purely by way of non-limiting example, in which:

Figure 1 is a side elevational view of a subassembly of a motor vehicle, made up of a sub-frame, power unit, and various members of the systems of the motor vehicle,

Figure 2 is an exploded perspective view of the subassembly illustrated in Figure 1, and

Figure 3 is a sectional view of a detail of Figure 1, on an enlarged scale.

Reference numeral 1 indicates a sub-frame of pressed sheet metal on which the power unit 2 and various members of the motor vehicle systems are assembled so as to constitute a subassembly

which is then installed in the body of the motor vehicle (indicated schematically S in Figure 1) in a single operation.

The sub-frame 1 has a front cross member 2 (with reference to the direction of travel of the motor vehicle, indicated by the arrow A in Figure 2) onto which are screwed two brackets 3 for supporting the radiator 4 of the engine cooling system. Each bracket 3 is screwed onto the front cross member 2 of the frame 1 by screws 5 and has, in correspondence with its front end which projects in a cantilever fashion from the cross member 2, a hole 6 engaged by a corresponding pin 7 at the lower end of the radiator 4, with the interposition of a rubber bush 8.

According to the present invention, the radiator 4 of the engine cooling system is used as a support element for the other members of the various systems of the motor vehicle. More particularly, the radiator 4 has two end manifolds 9 whose bodies are provided with brackets or bosses for the fixing of the aforesaid members.

Referring to the example illustrated in the drawings, one of the two end manifolds 9 of the radiator 4 has bosses 10 for the fixing of

attachment brackets 11 provided on a heat exchange 12 which forms part of the supercharging system of the engine. Clearly, this component is present only in the case in which the motor vehicle is provided with an engine of the supercharged type.

Similarly, the other end manifold 9 of the radiator 4 is provided with bosses 13 (only one of which can be seen in Figure 2) for the fixing of attachment brackets 14 which form part of a heat exchanger 15 for cooling the lubricating oil of the engine.

The two end manifolds 9 are also provided with four bosses 16 for the fixing, directly in front of the radiator, of a condensor 17 which forms part of the conditioning system for the air fed into the passenger compartment of the motor vehicle. To this end, the condensor is provided with end heads 18 having holes 19 for the fixing screws 20.

These fixing screws 20 can also be used to fix a partition 21,having openings 22, 23 for conveying the cooling air through the radiator 4 and the heat exchange 15,to the radiator 4 in a position between the latter and the condensor 17.

Finally, the radiator 4 has brackets 24 with holes 25 for fixing attachment appendages 26

provided on a structure 27 which supports rotatably the electric cooling fan 28 for the radiator.

It is clear that the radiator structure can be prearranged to support directly one or more of the afore-mentioned members, so that the radiator can be used on different models of motor vehicle and be adapted to different specific requirements.

It is also evident that, by virtue of the particular structure and arrangement described above, it is possible to assembly quickly and easily the subassembly consisting of the sub-frame, the power unit and the various members of the motor vehicle systems, and then proceed to install the subassembly in the body. Before installation in the body, the various components of the systems are joined together by couplings and hoses.

CLAIMS

1. Motor vehicle, including
a body (S),
a power unit (2),
a sub-frame (1) supported by the body (S) and carrying the power unit (2),
a series of members (4, 12, 15, 17, 21, 27) forming parts of the systems of the motor vehicle, among which is the radiator (4) of the engine cooling system,

characterised in that the radiator (4) of the engine cooling system is fixed to the sub-frame (1) and the remaining members of the motor vehicle systems are supported by the structure of the radiator (4).

2. Motor vehicle according to Claim 1, characterised in that the sub-frame (1) has a frame structure including a front cross member (2) carrying the radiator (4) of the engine cooling system, and in that the radiator (4) has a pair of end manifolds (9) each having a body with brackets or bosses for the fixing a series of the said members forming parts of the motor vehicle systems.

3. Motor vehicle according to Claim 2, characterised in that one of the end manifolds (9) of the raidator (4) is provided with brackets or bosses for the fixing of a heat exchanger (15) for cooling the lubricating oil of the engine to one side of the radiator (4).

4. Motor vehicle according to Claim 2, characterised in that one of the end manifolds (9) of the radiator (4) is provided with brackets or bosses (16) for the fixing of a heat exchanger (12) for the supercharging air of the engine to one side of the radiator (4).

5. Motor vehicle according to Claim 2, characterised in that the end manifolds (9) of the radiator (4) are provided with brackets or bosses (16) for fixing a condensor (17), which forms part of the air-conditioning system of the motor vehicle directly in front of the radiator (4).

6. Motor vehicle according to Claim 2, characterised in that the end manifolds (9) of the radiator (4) are provided with brackets or bosses (16) for fixing a partition for conveying the cooling air towards the radiator (4) directly in front of the radiator (4).

7. Motor vehicle according to Claim 2, characterised in that the radiator (4) is provided with brackets or bosses (25) for the fixing of a structure (27) for supporting the cooling fan (28) of the radiator.

8. Motor vehicle according to Claim 2, characterised in that the front cross member (2) of the sub-frame (1) is provided with support

brackets (3) having front ends projecting in a cantilever fashion from the front cross member (2) and each having a hole (6) engaged by a corresponding lower pin (7) of the radiator (4), with the interposition of a rubber bush (8).

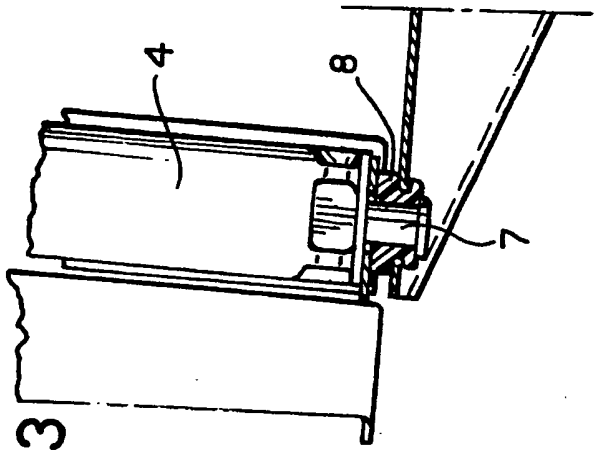

FIG. 3

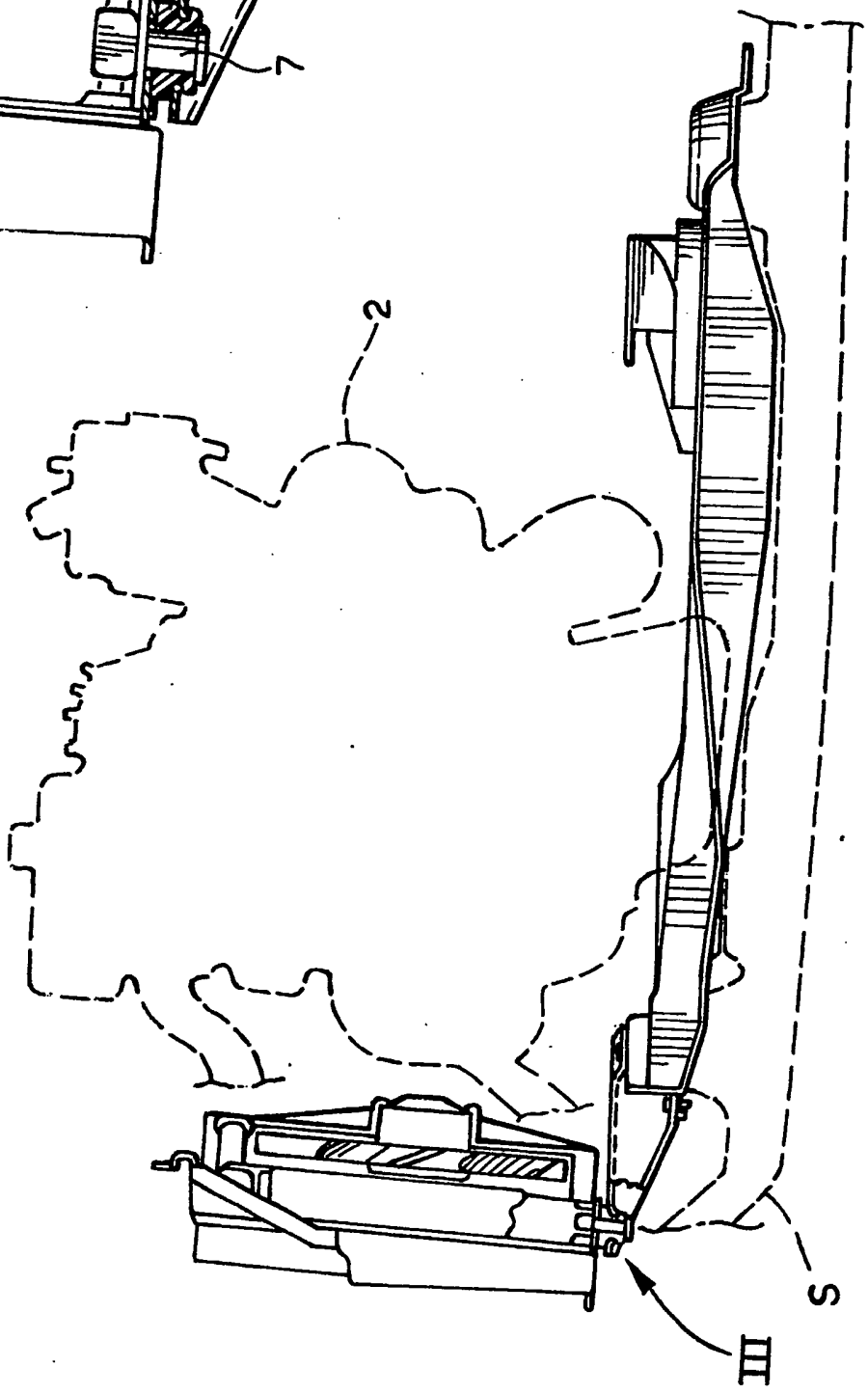

FIG. 1

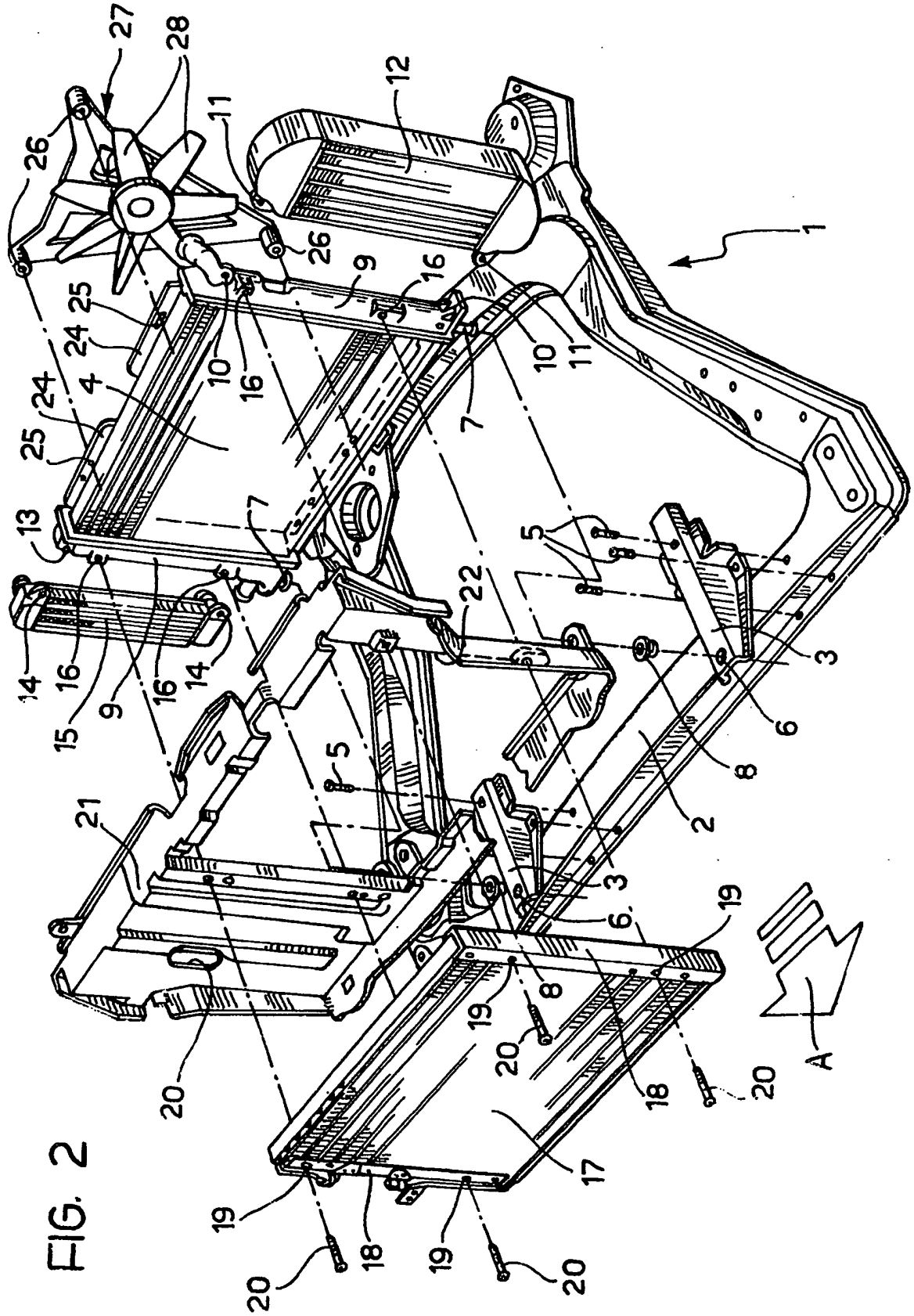

FIG. 2

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EUROPEAN SEARCH REPORT

0178266
Application number

EP 85 83 0239

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	FR-A-2 219 870 (DAIMLER-BENZ) * Claims 1,8; figure 2 *	1,2	B 60 K 5/10
X	FR-A- 448 831 (LEGRAND) * Page 1, left-hand column, last paragraph *	1	
A	FR-A- 402 739 (RENAULT) * Whole document *	1	
A	FR-A- 937 256 (SOCIETE TECHNICO-COMMERCIALE DE CONSTRUCTIONS AUTOMOBILES) * Abstract; abstract b *	1	
A	FR-A- 970 222 (VAN DOORNE) * Figures 1,2 *	1	TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 60 K B 62 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	06-01-1986	SCHMITTER J.M.

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